

REMARKS

Claims in the non-elected group has been canceled. In addition, claims have been amended to further clarify the subject matter regarded as the invention. Entry of this Amendment and reconsideration of the application are respectfully requested based on the following remarks.

In the Office Action, the examiner rejected claims 31-45. This rejection is fully traversed below. Claim 1 has been rejected under 35 U.S.C 103(a) as being unpatentable over *Lymberopoulos et al.* (U.S. Patent No. 6,085,688) in view of *Hills et al.* (U.S. Patent No. 6,217,786 B1). The examiner admits that there is no teaching in *Lymberopoulos et al.* with respect to gas chemistries used in the etching process. (Office Action, page 4). Firstly, it should be noted that the serious deficiencies of *Lymberopoulos et al.* cannot possibly be cured by *Hills et al.* Nevertheless, the Examiner proposes to combine the teaching of *Hills et al.* to overcome the deficiencies of *Lymberopoulos et al.*

It is respectfully submitted that the Examiner has failed to establish a prime facie case of obviousness. In the Office Action, the Examiner asserts that it would have been obvious to one of ordinary skilled in the art at the time of the invention to flow the claimed gas chemistries. To support this assertion, however, the Examiner merely states that use of the claimed gas chemistries would have been "anticipated to produce an expected result." The Examiner does not provide any evidence for this assertion. The Applicant respectfully requests that the Examiner provide evidence which supports this assertion.

Moreover, contrary to the Examiner's assertion, there is no teaching in *Hills et al.* with respect to flowing a combination of gases, wherein two or more gases of the combination of gases is a $C_x F_y H_z O_w$ gas. Instead, *Hills et al.* teaches flowing an etching gas the includes a Fluorocarbon gas, a Nitrogen reactant gas, an Oxygen reactant gas, an inert carrier gas, and a Hydrogen containing additive gas into the plasma reactor. (*Hills et al.*, Abstract.

Furthermore, there is no teaching in *Lymberopoulos et al.* with respect to changing said the radial variation in a controlled magnetic field within a plasma processing chamber in a region proximate to an antenna to improve the processing uniformity across said substrate. In the Office Action, the Examiner states that this limitation would have been

anticipated (Office Action, page 5). Again, the Applicant respectfully requests that the Examiner provide evidence which supports this assertion.

Claim 31, among other things, recites:

flowing reactant gases into said plasma processing chamber, said reactant gases include a combination of gases, wherein two or more gases of said combination of gases included in said reactant gases is a $C_x F_y H_z O_w$ gas;

changing said radial variation in said controlled magnetic field within said plasma processing chamber in said region proximate said antenna to improve said processing uniformity across said substrate.

It is respectfully submitted that the cited references taken alone or in any proper combination do not teach or suggest these limitations. Accordingly, it is respectfully submitted that independent claims 31 is patentable over cited art for these reason alone. Furthermore, claims that depend on claim 31 are patentable over the cited art for at least the same reasons as discussed above. Moreover, the dependent claims recite additional features that render them patentable for additional reasons. Therefore, it is submitted that all pending claims are patentably distinct from the cited references. Reconsideration of the application and an early Notice of Allowance are earnestly solicited.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below. Applicants hereby petition for an extension of time which may be required to

maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this Amendment is to be charged to Deposit Account No. 50-0388.

Respectfully submitted
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MARKED UP VERSION SHOWING CHANGES MADE

31. (Once Amended) A method for controlling processing uniformity while processing a substrate using a plasma-enhanced process, comprising:

providing a plasma processing chamber having a single chamber, substantially azimuthally symmetric configuration within which a plasma is both ignited and sustained during said processing of said substrate, said plasma processing chamber having no separate plasma generation chamber;

providing a coupling window disposed at an upper end of said plasma processing [system] chamber;

providing an RF antenna arrangement disposed above a plane defined by said substrate when said substrate is disposed within said plasma processing chamber for said processing;

providing an electromagnet arrangement disposed above said plane defined by said substrate, said electromagnet arrangement being configured so as to result in a radial variation in the controlled magnetic field within said plasma processing chamber in the region proximate said coupling window and antenna when at least one direct current is supplied to said electromagnet arrangement, said radial variation being effective to affect processing uniformity across said substrate;

providing a dc power supply coupled to said electromagnet arrangement;

placing said substrate into said plasma processing chamber;

flowing reactant gases into said plasma processing chamber, said reactant gases include a combination of gases, wherein [one] two or more gases of said combination of gases included in said reactant gases is a $C_x F_y H_z O_w$ gas[, and wherein x, y, z, and w are positive integers though any of z, w, and y can be zero];

striking said plasma out of said reactant gases; and

changing said radial variation in said controlled magnetic field within said plasma processing chamber in said region proximate to said antenna to improve said processing uniformity across said substrate.

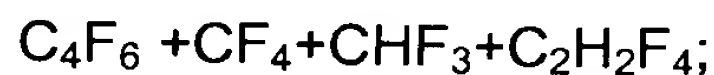
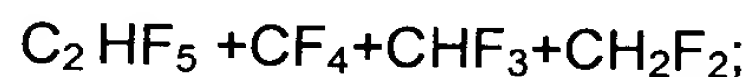
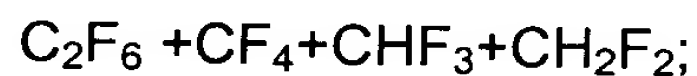
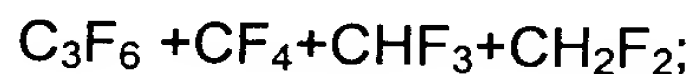
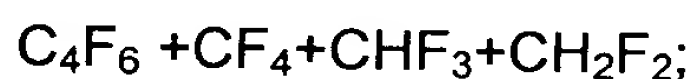
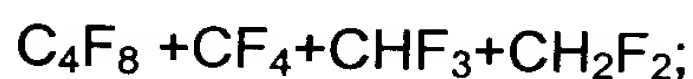
33. (Once Amended) The method of claim [22] 32 herein the reactant gases further include one or more gases selected from a group of gases consisting of He, Ne, Ar, Kr and Xe.

34. (Once Amended) The method of claim [21] 31 wherein the reactant gases further include one or more gases selected from a group of gases consisting of He, Ne, Ar, Kr and Xe.

35. (Once Amended) The method of claim [21] 31 wherein the reactant gases include a gas that is selected from a group of gases consisting of C₅F₈, C₄F₈, C₄F₆, C₃F₆, C₂F₆ and CF₄.

36. (Once Amended) The method of claim [21] 31 wherein the reactant gases include a gas that is selected from a group of gases consisting of C₂HF₈, C₂HF₅, CHF₃, C₂H₂F₂, C₂H₂F₄ and CH₂F₂.

37. (Once Amended) The method of claim [21] 31 wherein the reactant gases include a gas that is selected from a group of gases consisting of:



$C_2F_6 + CF_4 + CHF_3 + C_2H_2F_4;$

$C_2HF_5 + CF_4 + CHF_3 + C_2H_2F_4;$

$C_5F_8 + CHF_3 + C_2HF_5 + CH_2F_2;$

$C_4F_8 + CHF_3 + C_2HF_5 + CH_2F_2;$

$C_4F_6 + CHF_3 + C_2HF_5 + CH_2F_2;$

$C_3F_6 + CHF_3 + C_2HF_5 + CH_2F_2;$

$C_2F_6 + CHF_3 + C_2HF_5 + CH_2F_2;$ and

$CF_4 + CHF_3 + C_2HF_5 + CH_2F_2.$